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GB 1186676 A GB 1101048 A EP 0470265 A1

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(54) Impeller balancing in a blower

(57) A blower 10 comprises at least one impeller wheel 16 which is arranged in a housing 20 and is seated on a driven shaft 14. In order to compensate for impeller imbalance in the assembled state of the blower, the shaft protrudes beyond the impeller wheel in direction towards an air induction opening 22 in the housing. The protruding end portion 26 of the shaft, or a component 28 mounted thereon, has an annular groove in which an annular balancing member 34 with an eccentric weight is received and fixed in position under splaying-out against spring force.

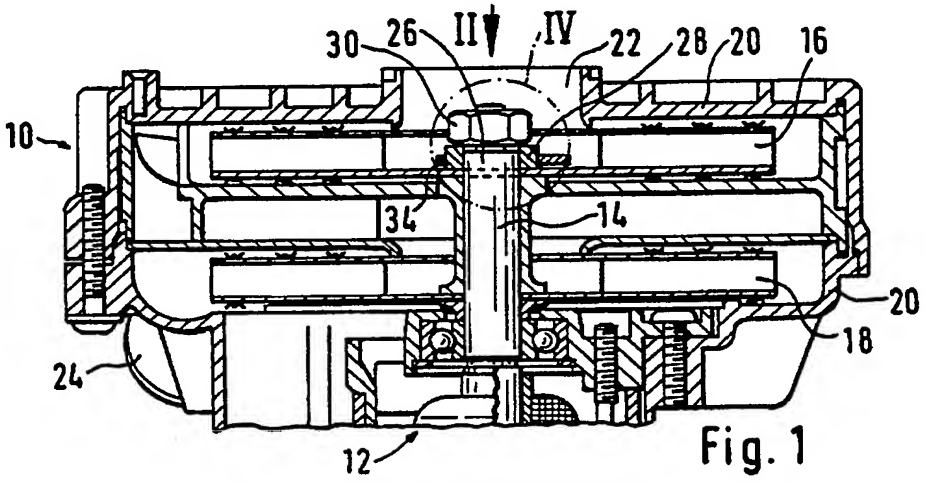

Fig. 1

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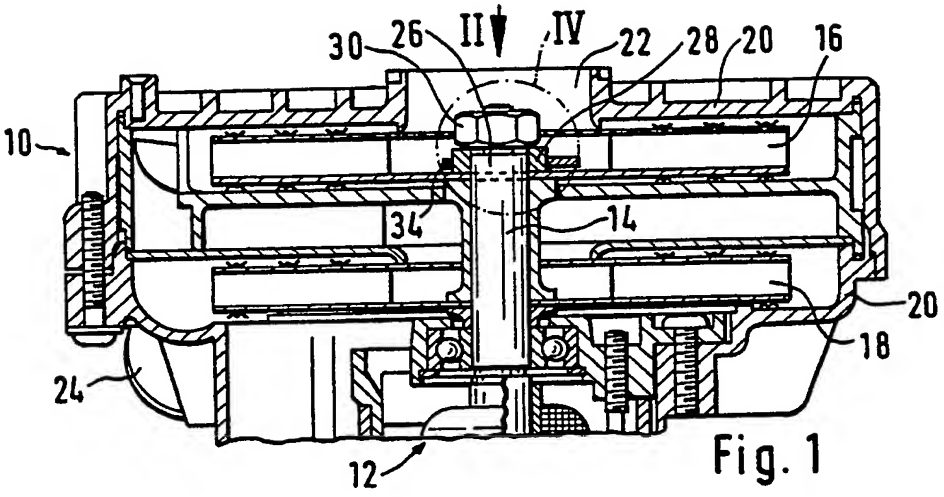

Fig. 1

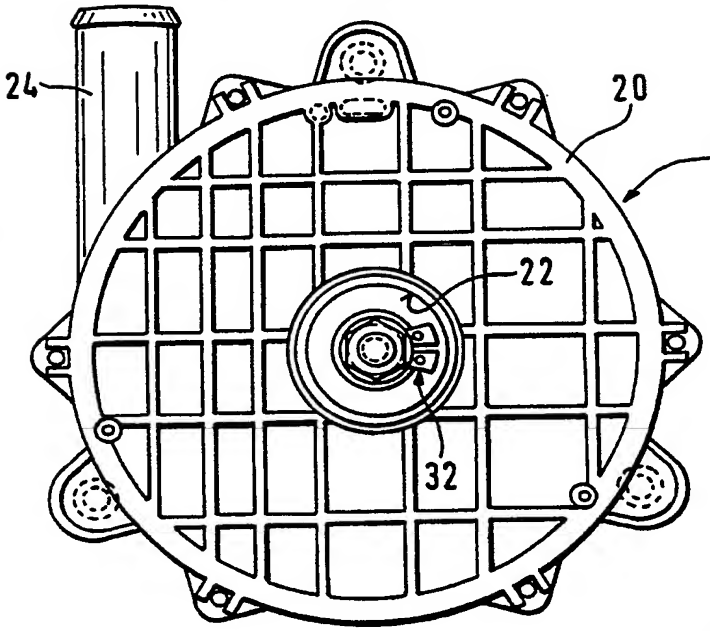

Fig. 2

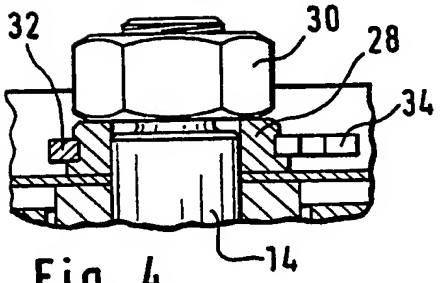

Fig. 4

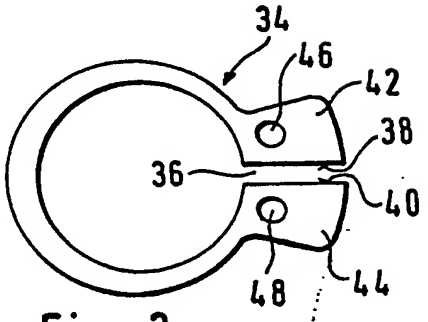

Fig. 3

IMPELLER BALANCING IN A BLOWER

The present invention relates to a blower and has particular reference to balancing an impeller of the blower.

A blower is known in which inevitably present imbalances are compensated for by eccentric elements fastened to the blades of the blower impeller. However, this is not possible when the blower is ready-assembled in an almost closed housing, because the blades are then no longer accessible.

According to the present invention there is provided a blower comprising at least one blower wheel arranged in a housing and seated on a driven shaft, wherein the shaft with a part member belonging thereto protrudes from the wheel in the direction of an opening in the housing and the member has an annular groove, into which a generally annular member, which has an eccentric weight, is insertable and fixable therein under splaying-out against a spring force.

Expediently, the member is a radially split ring. The ring can have, in the region of the one separating edge, a lobe-like enlargement extending substantially radially outwards. For preference, a respective such enlargement is arranged in the region of each of the separating edges of the ring. A respective bore can be arranged in each enlargement. The generally annular member can be made of spring steel, and the annular groove can be arranged in an end portion of the shaft or in a component at the end portion of the shaft.

A blower embodying the invention has the advantage that the member having the eccentric weight can be introduced into the groove, oriented according to requirements and fixed in place, by way of the housing opening.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of part of a two-stage blower embodying the invention;

Fig. 2 is a plan view of the blower in the direction of arrow II in Fig.1;

Fig. 3 is a plan view to enlarged scale of a balancing member in the blower; and

Fig. 4 is the detail IV in Fig. 1, to enlarged scale.

Referring now to the drawings, there is shown a two-stage radial blower 10, for example for feeding air into a motor vehicle exhaust pipe, comprising an electrical drive motor 12, the armature shaft of which has a prolongation 14 on which two impeller wheels 16 and 18 are seated. The wheels 16 and 18 are enclosed by a blower housing 20, which has an opening 22. The shaft prolongation 14 extends in the direction of the opening 22, which in the illustrated blower serves as an induction opening. The air inducted through the opening 22 is fed from the first pump stage, which incorporates the wheel 16, to the second pump stage, which incorporates the blower wheel 18. Air issuing from the second stage leaves the housing 20

through an exit stub pipe 24. The shaft 14 passes through the wheel 16 so that it issues by a partial member out of the wheel 16 in the direction of the opening 22. A clamping ring 28, which acts as a washer and is loaded by a securing nut 30, is mounted on the free end portion 26 of the shaft 14. Since the ring 28 is firmly connected with the shaft 14 during operation of the blower, it can be considered part of the shaft. An annular groove 32, into which a balancing member 34 is insertable, is formed in the circumferential surface of the ring 28. The member 34 is illustrated to enlarged scale in Fig. 3 and has the general form of a circlip. It is substantially annular, but split by a slot 36. Provided in the region of the separating edges 38 and 40 are lobe-shaped widenings 42 and 44, which extend substantially radially outwards. A bore 46 and 48 is formed in each of the widenings.

In departure from the described embodiment, it is feasible to insert the member 32 into an annular groove formed directly in the shaft 14, i.e. in the end portion 26.

When an imbalance is ascertained and located during final testing of the blower, a member 34 matched to the ascertained imbalance is inserted into the groove 32, appropriately oriented and fixed in place with the aid of a circlip ring pliers introduced through the housing opening 22. The fixing is carried out by the member 34, which is of spring steel, initially being widened against spring force with the aid of the pliers and pushed over the ring 28 until it reaches the groove 32. Thereafter, the member 34 is relieved by way of the circlip ring pliers and snaps into the groove

32, where it is firmly seated under spring bias on the base of the groove and thus incapable of rotation. Slight corrections of rotational position can readily be undertaken in that the member 34 is again tensioned slightly with the aid of the pliers and rotated. For balancing out different degrees of imbalance members 34 are provided in which the widenings 42 and 44 serving as counterweights are of different sizes.

CLAIMS

1. A blower comprising a housing with an opening, an impeller mounted on axle means in the housing, the axle means protruding from the impeller in direction towards the opening and being provided in its protruding part with an annular groove, and a balancing member fixed to the axle means by insertion through the opening and mounting in the groove.

2. A blower as claimed in claim 2, wherein the balance member is substantially annular in shape and has an eccentrically disposed weight.

3. A blower as claimed in claim 2, wherein the balance member is retained in the groove by spring force.

4. A blower as claimed in claim 3, wherein the balance member comprises portions which are spreadable apart against spring force for mounting of the member in the groove.

5. A blower as claimed in claim 4, wherein the member is a radially split ring.

6. A blower as claimed in claim 5, wherein the weight is provided by a radially outwardly extending enlargement of the ring in the region of one boundary edge of the split.

7. A blower as claimed in claim 5, wherein the weight is provided by a respective radially outwardly extending enlargement of the ring in the region of each boundary edge of the split.

8. A blower as claimed in claim 7, wherein each enlargement has a bore therethrough.

9. A blower as claimed in any one of the preceding claims, wherein the member is made of spring steel.

10. A blower as claimed in any one of the preceding claims, wherein the axle means comprises a shaft and the groove is formed in an end portion of the shaft.

11. A blower as claimed in any one of claims 1 to 9, wherein the axle means comprises a shaft and a component arranged on an end portion of the shaft and the groove is formed in the component.

12. A blower substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(: Search report)

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Relevant Technical Fields

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Search Examiner
M D WALKER

Date of completion of Search
12 MAY 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI

Documents considered relevant following a search in respect of Claims :-
ALL

Categories of documents

X: Document indicating lack of novelty or of inventive step.

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P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
A	GB 1186676	(NRDC) page 2 lines 22-47	1
A	GB 1101048	(RULE) the figures	1
A	EP 0470265 A1	(FANUC LTD) Figures 1, 3, 5	1

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).